1   3.   The method of claim 2, wherein after determining the short-term averaged

2   energy and the long-term averaged energy, the method further comprises:

3   determining whether a sum of the short-term averaged energy and a factor is greater

4   than the long-term averaged energy; and

5   determining that the current audio frame represents silence if the sum is less than the

6   long-term averaged energy, without necessitating a determination of the peak-to-mean

7   likelihood ratio.

1   4.   The method of claim 3, upon determining that the sum is greater than the

2   long-term averaged energy and before determining the peak-to-mean likelihood ratio, the

3   method further comprises:

4   determining whether a difference between the long-term averaged energy and the

5   short-term averaged energy is less than a predetermined threshold;

6   determining that the current audio frame represents voice if the difference is greater

7   than the predetermined threshold; and

8   continuing by determining the peak-to-mean likelihood ratio if the difference is less

9   than the predetermined threshold.

1   5.   The method of claim 2, wherein the determining of the short-term averaged

2   energy comprises:

3   determining an energy, in decibels, of the current audio frame;

4   determining a short-term averaged energy for a prior audio frame; and

5   conducting a weighted average of the energy of the current audio frame and the short-

6   term averaged energy for the prior audio frame.

1   6.   (Twice Amended)   A method for enhancing voice activity detection

2   comprising:

3   determining a peak-to-mean likelihood ratio, the determining a peak-to-mean

4   likelihood ratio comprises

5   calculating an averaged peak-to-mean ratio for the current audio frame,

6   determining a maximum averaged peak-to-mean ratio,

7   determining a minimum averaged peak-to-mean ratio,

8   determining a difference between the maximum averaged peak-to-mean ratio

9   and the averaged peak-to-mean ratio for the current audio frame,

10   determining a difference between the maximum averaged peak-to-mean ratio

11   and the minimum averaged peak-to-mean ratio, and

12   conducting a ratio, a denominator of the ratio being the difference between the

13   maximum averaged peak-to-mean ratio and the minimum averaged peak-to-mean

14   ratio, the numerator being the difference between the maximum averaged peak-to-

15   mean ratio and the averaged peak-to-mean ratio; and

16   comparing the peak-to-mean likelihood ratio to a selected threshold to determine

17   whether a current audio frame represents a voice signal.

1   8.   (Amended) The communication module of claim 12 , wherein the voice

2   activity detector, when executed, controls the processing unit to determine whether a sum of

3   the short-term averaged energy and a predetermined factor is greater than the long-term

4   averaged energy, and to signal that the current audio frame represents silence if the sum is

5   less than the long-term averaged energy.

1   9.   The communication module of claim 8, wherein the voice activity detector,

2   when executed, controls the processing unit to determine whether a difference between the

3   long-term averaged energy and the short-term averaged energy is less than a predetermined

4   threshold, and to signal that the current audio frame represents voice if the difference is

5   greater than the predetermined threshold.

1   10.   (Cancelled)

11.   (Amended) The communication module of claim 9, wherein the voice activity

2   detector, when executed, controls the processing unit to determine a peak-to-mean ratio by (i)

3   sampling an analog signal a predetermined number of times to produce a plurality of sampled

4   signals each having a sampled value, (ii) determining a maximum value of the plurality of

5   sampled signals, and (iii) conducting a ratio between an absolute value of the maximum

6   value and a summation of the sampled values for the plurality of sampled signals.

1   12.   (Twice Amended) A communication module comprising:

2   a substrate;

3   a processing unit placed on the substrate; and

4   a memory coupled to the processing unit, the memory to contain a voice activity

5   detector which, when executed, controls the processing unit to

6   determine a peak-to-mean likelihood ratio for the current audio frame by (i)

7   monitoring a maximum averaged peak-to-mean ratio and a minimum averaged peak-

8   to-mean ratio, (ii) determining a first result being a difference between the maximum

9   averaged peak-to-mean ratio and the averaged peak-to-mean ratio for the current

10   audio frame, (iii) determining a second result being a difference between the

11   maximum averaged peak-to-mean ratio and the minimum averaged peak-to-mean

12   ratio, and (iv) conducting a ratio between the first result as a numerator and the

13   second result as a denominator; and

14.   compare the peak-to-mean likelihood ration to a selected threshold to

15   determine whether the current audio frame represents a voice signal.

1   13.   (Twice Amended)   A machine readable medium having embodied thereon

2   a computer program for processing by a machine, the computer program comprising:

3   a first routine for determining a normalized peak-to-mean likelihood ratio including

4   (i) a denominator having a value substantially equal to a difference between a maximum

5   averaged peak-to-mean ratio and a minimum averaged peak-to-mean ratio and (ii) a

6   numerator having a value substantially equal to a difference between the maximum averaged

7   peak-to-mean ratio and the averaged peak-to-mean ratio; and

8   a second routine for comparing the peak-to-mean likelihood ratio to a selected

9   threshold to determine whether an audio frame being transmitted represents a voice signal.

---

1   14.   The machine readable medium of claim 13, wherein the computer program

2   further comprising:

3   a third routine for determining a short-term averaged energy for the audio frame, the

4   third routine being executed before the first and second routines; and

5   a fourth routine for determining a long-term averaged energy for the audio frame, the

6   fourth routine being executed before the first and second routines.

1   15.   The machine readable medium of claim 14, wherein the computer program

2   further comprising:

3   a fifth routine for determining whether a sum of the short-term averaged energy and a

4   predetermined factor is greater than the long-term averaged energy, the fifth routine being

5   executed before the first and second routines; and

6   a sixth routine for determining whether a difference between the long-term averaged

7   energy and the short-term averaged energy is less than a predetermined threshold, the sixth

8   routine being executed after determining that the sum is greater than the long-term averaged

9   energy and before execution of the first and second routines.

1   16.   The machine readable medium of claim 15, wherein the fifth routine
2   determining that the current audio frame represents silence if the sum is less than the long-
3   term averaged energy.

1   17.   The machine readable medium of claim 15, wherein the sixth routine
2   determining that the current audio frame represents voice if the difference is greater than the
3   predetermined threshold.

1   18.   (Cancelled)

1   20.   A method for enhancing voice activity detection comprising:
2   determining a peak-to-mean likelihood ratio including (i) a denominator having a
3   value substantially equal to a difference between a maximum averaged peak-to-mean ratio
4   and a minimum averaged peak-to-mean ratio and (ii) a numerator having a value
5   substantially equal to a difference between the maximum averaged peak-to-mean ratio and
6   the averaged peak-to-mean ratio; and
7   comparing the peak-to-mean likelihood ratio to a selected threshold to determine
8   whether a current audio frame represents a voice signal.

1   21.   The method of claim 20, wherein prior to determining the peak-to-mean
2   likelihood ratio, the method further comprises:
3   determining a short-term averaged energy for the current audio frame; and
4   determining a long-term averaged energy for the current audio frame.

1   22.   The method of claim 21, wherein after determining the short-term averaged
2   energy and the long-term averaged energy, the method further comprises:
3   determining whether a sum of the short-term averaged energy and a factor is greater
4   than the long-term averaged energy; and

5   determining that the current audio frame represents silence if the sum is less than the

6   long-term averaged energy, without necessitating a determination of the peak-to-mean

7   likelihood ratio.

1   23.   The method of claim 22, upon determining that the sum is greater than the

2   long-term averaged energy and before determining the peak-to-mean likelihood ratio, the

3   method further comprises:

4   determining whether a difference between the long-term averaged energy and the

5   short-term averaged energy is less than a predetermined threshold;

6   determining that the current audio frame represents voice if the difference is greater

7   than the predetermined threshold; and

8   continuing by determining the peak-to-mean likelihood ratio if the difference is less

9   than the predetermined threshold.

1   24.   The method of claim 21, wherein the determining of the short-term averaged

2   energy comprises:

3   determining an energy, in decibels, of the current audio frame;

4   determining a short-term averaged energy for a prior audio frame; and

5   conducting a weighted average of the energy of the current audio frame and the short-

6   term averaged energy for the prior audio frame.